NATURAL RESOURCES CONSERVATION SERVICE

RIPARIAN FOREST BUFFER (ACRE)

CODE 391

MONTANA CONSERVATION PRACTICE SPECIFICATION

GENERAL SPECIFICATIONS: Procedures, technical details, and other information listed below provide additional guidance for carrying out selected components of the named practice. This material is referenced from the conservation practice standard for the named practice and supplements the requirements and considerations listed therein.

PLANT SPACING: Initial plant-to-plant spacing for trees and shrubs will depend on their potential height at 20 years of age. Heights may be estimated based on:

1) performance of the individual species--or comparable species--in nearby areas on similar sites, or

2) predetermined and documented heights using Conservation Tree/Shrub Suitability Groups, Section II of the Field Office Technical Guide. Plant spacing specifications are:

PLANT TYPES/HEIGHTS	PLANT-TO-PLANT SPACING ± 25% (IN FEET)
* **Shrubs less than 10 feet in height**	**4**
* **Shrubs and trees from 10 to 25 feet in height (INCLUDES COLUMNAR TREES)**	**6**
* **Trees greater than 25 feet in height**	**10**

PLANT LIST: TABLE 1 lists trees, shrubs, and grasses commonly associated with and suited to riparian areas. Key attributes are listed for each plant to assist with the design process for establishing new buffers.

ESTIMATING PLANTING STOCK:

- To determine the plantable area, deduct from the total buffer area those areas already stocked, anticipated to regenerate naturally, and those areas desired to be non-stocked.
- Determine the percent composition (ratio of plants or canopy cover based on mature crown width) of each species in the planting.
- To determine the actual number of plants by species apportion the plantable area for each species based on its percent composition, then divide by the area of its plant spacing or mature canopy.

Most buffers do not require planting 100 percent of the area or a 100 percent canopy cover. Mixtures of plant types with different spacing needs complicates stocking estimates. The final numbers of plants by species requires close attention to all these factors. Consider using Forestry Technical Note No. MT-21 dated March 2002 to estimate planting stock for woody plantings. The technical note is a spreadsheet that provides an efficient means of calculating the amount of plant materials needed for area plantings.

CARE, HANDLING, SIZE, AND PLANTING REQUIREMENTS FOR WOODY PLANTING STOCK:

Planting stock will be stored in a cool, moist environment (34–38 degrees F) or heeled in near planting site. During all stages of handling and storage, keep stock tops dry and free of mold and roots moist and cool. Destroy stock that has been allowed to dry, to heat up in storage (e.g., within a bale, delivery carton or container), or that has developed mold or other pests. Live cuttings that will not be immediately planted shall

be promptly placed in controlled storage conditions (34-38 degrees F and 100 percent humidity) and protected until planting time. Tops of dormant-season collected cuttings may be dipped into latex paint, paraffin, or sealing wax to prevent desiccation and mark the up-end. Prior to planting, dormant-season cuttings will be soaked in water for 24 to 48 hours to rehydrate the stems.

Planting Stock Grade Specifications:

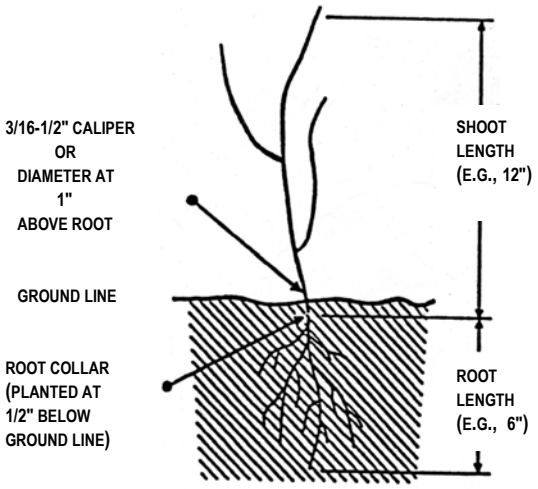
SPECIES	CALIPER 1 INCH ABOVE ROOT COLLAR (INCHES)	HEIGHT RANGE (INCHES)	AGE (YEARS)
Broadleaf	3/16– 3/8	12– 24	1–3
Evergreen	1/4– 1/2	6– 12	2–4

For cuttings: 1) avoid using material less than 1/2-inch in diameter at the small end; 2) use two to three year old wood; 3) cut off tops with apical buds: 4) remove side branches; and, 5) produce lengths long enough to reach adequate soil moisture required by the individual species during the growing season. Plant cuttings into the lowest water table depth. Rooted planting stock must not exceed a 2:1 shoot-to-root ratio (SEE FIGURE 1). Container stock shall normally not exceed a 1-gallon can size.

Planting time:

Fall—after dormancy sets in (leaf drop) and where you will have continuous snow cover overwinter.

Spring—prior to full extension of new leaves.



SHOOT-TO-ROOT RATIO IS 12" TO 6" OR 2:1

FIGURE 1. PLANT OR STOCK SIZE REQUIREMENTS.

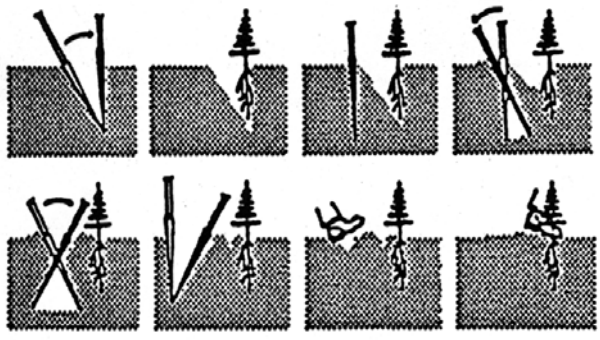


FIGURE 2. PROPER PLANT AND ROOT PLACEMENT OF ROOTED STOCK USING A PLANTING BAR.

Roots of bareroot stock shall be kept moist during planting operations by placing in a water-soil (mud) slurry, peat moss, super-absorbent (e.g., polyacrylamide) slurry or other equivalent material. Rooting medium of container or potted stock shall be kept moist at all times by periodic watering. Pre-treat stored cuttings with several days of soaking just before planting. Stock shall not be planted when the soil is frozen or dry. Rooted stock will be planted in a vertical position with the root collars approximately 1/2-inch below the soil surface. Insert cuttings to the depth required to reach adequate perennial soil moisture with at least 2-3 buds above ground. The planting trench or hole must be deep and wide enough to permit roots to spread out and down without J-rooting or L-rooting. After planting of rooted stock or cuttings, pack soil around each plant firmly to eliminate air pockets (SEE FIGURE 2).

Some species (i.e., red osier dogwood, water birch) can be collected as clumps on-site and moved to another area where more woody plants are desired. Clumps are usually taken with a backhoe. Dig to 12–15 inches depth to get most of the root mass. Cut back crowns to 1/4 original height. Cump plantings work best in early spring when plants are dormant from March 1st to June 1st. Cover root crown with soil slightly below original depth.

PREPARATION OF PLANTING SITES: Planting sites shall be properly prepared based on the soil type and vegetative conditions listed below. For sites to be tilled, leave a minimum 3-foot untreated strip at the edge of the bank or shoreline. If spring runoff will cause erosion, consider other methods. Avoid sites that have had recent application of pesticides harmful to woody species to be planted. If pesticides are used, apply only when needed. Handle and dispose of pesticides properly and within federal, state, and local regulations. Follow label directions and heed all precautions listed on the container.

Fabric mulch may be used for weed control and moisture conservation for new plantings on all sites, particularly those with pronounced growing season moisture deficits or invasive, weedy species. Refer to Field Office Technical Guide, Section IV–Practice Standards and Specifications, 484–Mulching for installation procedures.

Based on site conditions and predominant soil texture of the fine earth fraction, procedures include:

Tillage sites with loamy/clayey soils

- Sod and alfalfa sites

  Summer fallow 1 year to kill the sod or alfalfa. Till (moldboard plow, disk plow, rototiller, or similar equipment) in the spring before planting the stock. A fall-sown crop of oats may be used where needed to control erosion.
  Sod may be killed by non-selective herbicides the season prior to planting. Plant in the residue if possible, otherwise cultivate prior to planting. On heavy soils, tillage is usually necessary to achieve a satisfactory seedbed when a tree planting machine is used.

- Small grain or row crop sites

  If the site is in row crop, till (moldboard plow, disk plow, rototiller, or similar equipment) in the fall or in the spring prior to planting the trees or shrubs. If the site has a plow or hard pan in subsoil, perform a deep disking or ripping operation in the fall. A fall-sown crop of oats may be used where needed to control erosion.

  If the site is in small grain stubble, the stock may be planted in the spring without further preparation. If fabric mulch is to be installed, till in the spring before planting.

  Tillage on steep slopes must be on the contour or cross-slope. A cover crop between the rows may be necessary to control erosion and sediment deposition on planted stock.

Tillage sites with sandy soils

- Sod and alfalfa sites

  Till (moldboard plow, disk plow, rototiller, or similar equipment) and plant to a spring cover crop (corn, grain, sorghum, etc.) the year prior to planting. Leave a stubble cover in which to plant. A light disking may be needed before planting if fabric mulch is used.

  Sod may be killed by non-selective herbicides the season prior to planting. Plant trees or shrubs in the residue.

  Hand scalp or strip an area at least 3 feet in diameter and two-to-four inches deep and place plants in the center.

  Rototill a 3-foot wide strip. (Place plants in the center of the tilled area.) Where a drip watering system will not be used, rototill the strip the year prior to planting.

- Small grain or row crop sites

  If the site is in small grain, corn, or similar clean tilled crop, and it is reasonably free of weeds, plant stock in the stubble without prior preparation, It may be necessary to till a narrow strip with a disk or other implement to kill weeds or volunteer grain, or to prevent stalks and other residue from clogging the tree planter. If fabric mulch is used, disking may also be needed. A cover crop or stubble may be needed between the rows to protect the planting from water or wind erosion.

Non-tillage sites and/or erosive sites

On sites where it is not practical or possible to operate equipment (steepness, rockiness, wetness, etc.), where tillage of the site will cause excessive erosion, or where tillage of the site is impractical, the methods listed below may be used.
Machine or hand scalp, rototill, or chemically kill a vegetative area at least 3 feet in diameter prior to planting and plant in the center.

Competing vegetation will need to be controlled for the first 5 years. The use of fabric squares, chemical or mechanical control are tools used to control the competing vegetation.

Random scattered plantings in areas lacking woody vegetation throughout the riparian site would look more natural and are encouraged.

Sites with undesirable noxious weeds (salt cedar) or shrubs (Russian olive) will need initial treatments that physically removes and kills the brush species to facilitate planting of desired stock and prevent re-encroachment of the plant. Suitable methods include hand-cutting and removal, brush hogging, brush-blading, or other equivalent procedure with repeated treatment or use of herbicides to control resprouting.

Survival Percentages: For a successful tree or shrub planting, it is required that 75% of all trees or shrubs planted survive as inventoried after "leaf out" during spring or summer of the second year.

EXPLANATION OF TERMS–TABLE 1: Species are grouped by plant type and arranged in alphabetical order by common name. Heights are listed for applicable Major Land Resource Areas (MLRA's, USDA Ag. Handbook 296, Dec. 1981) and precipitation zones. Heights and attributes represent expected performance and characteristics of the individual plant at the reference age in dominant canopy positions on medium-textured, non-saline, neutral pH soils. The reference age for trees is 20 years of age. The reference age for shrubs is 10 years.

ATTRIBUTES: Codes include:

H = HIGH, M = MEDIUM, L = LOW,

Y = YES, N = NO,

G = GOOD, F = FAIR, P = POOR.

1. **SOIL TEXTURE.** The plant's ability to grow and compete in various soil textures. G = plants can grow well in this soil texture; F = plants can grow in this soil texture; P = plants grow poorly under these soil conditions.
2. **SOIL SALINE/ALKALINE TOLERANCE.** The plant's ability to grow in saline/alkaline soil conditions. H = plants can withstand and/or grow in strongly saline/alkaline conditions; M = plants can withstand and/or grow in moderately saline/ alkaline conditions; L = plants can withstand and/or grow only in slightly saline/alkaline conditions.
3. **INUNDATION TOLERANCE.** General capacity of the plant to withstand standing water, low soil aeration conditions. H = can tolerate 5 or more days of inundation; M = can tolerate 2-5 day events; L = can tolerate one-day or less of inundation.
4. **SOIL SATURATION TOLERANCE.** The plant's capacity to grow in near or saturated soil conditions. H = plant can withstand *"wet feet"*; M = some tolerance to saturated conditions; L = little or no tolerance of water-saturated soil.
5. **DROUGHT TOLERANCE.** The plant's capacity to grow in drought or dry soil conditions. H = plant can withstand or has physiology to survive droughty periods; M = some tolerance to drought or dry conditions; L = little or no tolerance of dry soil conditions.
6. **SHADE TOLERANCE.** The plant's capacity to grow in a shaded condition. H = can grow in the shade of an overstory; M = can grow in partial shade; L = needs full or nearly full sunlight.
7. **SHADE VALUE.** The density or fullness of shade provided by an individual plant's crown in a full leaf-out condition. H = provides full shade; M = a partially open crown that provides patchy or incomplete shade; L = a very open crown that provides little shade.
8. **AESTHETICS.** A very general rating ("H," "M," or "L") that indicates some aspect of the plant, e.g., flowers, special foliage characteristic, or plant part color, that enhances the appeal or viewing of the planting.
9. **NATIVE SPECIES.** "Y" indicates that plant is native to the state; "N" indicates it is introduced.
10. **SEDIMENT DEPOSITION TOLERANCE.** H = plant can withstand repeated, deep deposits of sediment; M = plant can withstand repeated, shallow deposits of sediment; L = plant can withstand little or no sediment deposits.

TABLE 1. PLANT LIST

COMMON NAME	SCIENTIFIC NAME	ZONE	10-14" PPZ	15-19" PPZ	20-24" PPZ	24" + PPZ	20-YEAR HEIGHT (FEET)	20-YEAR CROWN WIDTH (FEET)	SALINE/ALKALINE TOLERANCE	INUNDATION TOLERANCE	SOIL SATURATION TOLERANCE	DROUGHT TOLERANCE	SHADE TOLERANCE	SHADE VALUE	AESTHESITICS	NATIVE SPECIES	SEDIMENT DEPOSIT TOLERANCE
TREE (CONIFER)																	
Engelman Spruce	*Picea engelmannii*	1 & 2			X	X	15	10	L	H	H	M	M	H	H	Y	H
White Spruce	*Picea glauca*	1 & 2		X	X	X	15	10	L	H	H	M	M	H	H	Y	H
Subalpine Fir	*Abies lasiocarpa*	1 & 2				X	20	9	L	H	H	L	H	H	M	Y	H
Western Redcedar	*Thuja plicata*	1 & 2				X	12	8	M	H	H	L	H	H	H	Y	H
Ponderosa Pine	*Pinus ponderosa*	2	X	X			17	12	M	M	L	H	L	M	H	Y	L
Douglas Fir	*Pseudotsuga menziesii*	2	X	X	X		15	10	M	M	M	H	M	M	H	Y	M
Western Larch	*Larix occidentalis*	2			X	X	17	9	L	L	L	L	L	M	H	Y	L
Grand Fir	*Abies grandis*	2			X	X	20	10	L	M	H	L	H	H	M	Y	M
Rocky Mountain Juniper	*Juniperus scopulcrum*	2	X	X			12	9	M	M	L	H	M	L	M	Y	M
TREE (DECIDUOUS)																	
Plains Cottonwood	*Populus sargentii*	1 & 2	X				45	25	M	H	H	H	L	H	H	Y	H
Black Cottonwood	*Populus trichocarpa*	1 & 2	X	X			45	25	M	H	H	M	L	H	H	Y	H
Narrowleaf Cottonwood	*Populus angustifolia*	1 & 2	X	X			45	25	M	H	H	M	L	H	H	Y	H
Green Ash	*Fraxinus pennsylvanica*	2	X	X			18	11	M	M	M	H	H	H	H	Y	M
Black Hawthorne	*Crataegus douglasii*	1 & 2		X	X		12	10	L	M	M	M	M	M	M	Y	L
Mountain Maple	*Acer glabrum*	1 & 2			X	X	15	9	L	L	M	L	H	M	H	Y	L
Quaking Aspen	*Populus tremuloides*	1 & 2		X	X	X	25	15	M	M	H	M	L	H	H	Y	M
Water Birch	*Betula occidentalis*	1 & 2			X	X	15	11	L	H	H	L	L	H	H	Y	H
Thinleaved Alder	*Alnus incana*	1 & 2			X	X	15	10	L	H	H	L	M	H	M	Y	H
Boxelder	*Acer negundo*	2		X			15	15	L	M	M	M	M	M	M	Y	M

CONTINUED TABLE 1. PLANT LIST SHRUBS

TABLE 1. PLANT LIST

COMMON NAME	SCIENTIFIC NAME	ZONE	10-14" PPZ	15-19" PPZ	20-24" PPZ	24" + PPZ	20-YEAR HEIGHT (FEET)	20-YEAR CROWN WIDTH (FEET)	SALINE/ALKALINE TOLERANCE	INUNDATION TOLERANCE	SOIL SATURATION TOLERANCE	DROUGHT TOLERANCE	SHADE TOLERANCE	SHADE VALUE	AESTHESITICS	NATIVE SPECIES	SEDIMENT DEPOSIT TOLERANCE
SHRUB																	
American plum	*Prunus americana*	2	X	X	X		10	9	M	M	M	M	L	L	H	Y	H
Native Willows	*Salix* spp.	1 & 2	X	X	X	X	15	13	M	H	H	L	L	M	H	Y	H
Big Sagebrush	*Artemisia tridentata*	2	X	X	X		4	3	M	L	L	H	L	L	M	Y	M
Blue Elderberry	*Sambucus caerulea*	1 & 2			X	X	6	5	L	H	L	H	H	M	H	Y	M
Skunkbush sumac	*Rhus trilobata*	2	X	X	X		8	5	H	L	L	H	L	H	M	Y	L
Common chokecherry	*Prunus virginiana*	2	X	X	X	X	10	9	M	H	M	H	M	M	H	Y	M
Redosier dogwood	*Cornus stolonifera*	1 & 2			X	X	7	6	M	H	H	H	M	M	M	Y	H
Silver buffaloberry	*Sherperdia argentea*	2	X	X	X	X	10	7	H	H	H	H	L	H	M	Y	M
Snowberry	*Symphoricarpus albus*	2		X	X		3	2	L	H	M	H	M	L	H	Y	M
Wild Rose	*Rosa* spp.	2		X	X		4	5	M	H	M	H	M	L	M	Y	L
Serviceberry	*Amelanchier alnifolia*	2		X	X		10	7	L	M	M	L	M	M	H	Y	M
Sticky Currant	*Ribes viscosissimum*	2	X	X	X		4	5	L	M	M	M	M	L	M	Y	L
Silverberry	*Elaeagnus commutata*	1 & 2	X	X	X		6	7	H	H	H	H	L	L	M	Y	H

CONTINUED TABLE 1. PLANT LIST GRASS

TABLE 1. PLANT LIST

COMMON NAME	SCIENTIFIC NAME	ZONE	10-14" PPZ	15-19" PPZ	20-24" PPZ	24" + PPZ	20-YEAR HEIGHT (FEET)	SOIL TEXTURE			SALINE/ALKALINE TOLERANCE	INUNDATION TOLERANCE	SOIL SATURATION TOLERANCE	DROUGHT TOLERANCE	SHADE TOLERANCE	SHADE VALUE	AESTHESITICS	NATIVE SPECIES	SEDIMENT DEPOSIT TOLERANCE
								SANDY	LOAMY	CLAYEY									
GRASS																			
Alkali sacaton	*Sporobulus airoides*	3	X	X			--	P	F	G	H	H	H	H	--	--	--	Y	M
Slender Wheatgrass	*Elymus trachycaulus*	3	X	X			--	G	G	G	H	M	M	H	--	--	--	Y	M
Beardless Wildrye	*Elymus triticoides*	3				X	--	F	G	F	H	H	H	L	--	--	--	Y	M
Inland saltgrass	*Distichlis stricta*	3	X	X	X	X	--	G	G	G	M	H	H	L	--	--	--	Y	M
Smooth brome	*Bromus inermis*	3	X	X	X	X	--	F	G	F	M	H	L	H	--	--	--	N	M
Thickspike Wheatgrass	*Elymus macrourus*	3	X	X			--	G	G	P	M	H	L	H	--	--	--	Y	H
Western Wheatgrass	*Pascopyrum smithii*	3	X	X	X		--	P	G	G	H	H	M	H	--	--	--	Y	H
Reed canarygrass	*Phalaris arundianacca*	3				X	--	F	G	F	L	H	H	L	--	--	--	Y	H
Basin Wildrye	*Elymus cinereus*	3				X	--	F	G	F	M	H	H	L	--	--	--	Y	M
Streambank Wheatgrass	*Elymus lanceolatus*	3	X	X			--	F	G	F	M	H	L	H	--	--	--	Y	L
Creeping foxtail	*Alopecurus arundinaceus*	3				X	--	F	G	F	L	H	H	L	--	--	--	Y	M
Sedges	*Carex* spp.	1		X	X	X	--	P	G	F	L	H	H	L	--	--	--	Y	L
Bulrush	*Scirpus* spp.	1		X	X	X	--	P	G	F	L	H	H	L	--	--	--	Y	M

Specification MT391-10

NO INFORMATION